



Northeast Utilities burns cleared brush using fanned air and kerosene to intensify burning with less air pollution.



In selective initial clearing, chipper is used to help handle brush.



Selective basal spray by back pack power sprayer is part of maintenance program.



A 115 KV right-of-way under good control as the result of selective basal sprays. Ornamental steel poles are in background.



Selective initial clearing for a 345 KV line through a public recreation area includes a narrow access road with small trees and shrubs saved.

small quantities of hydrocarbons to the atmosphere. Native brush yields about 6.7 pounds per ton burned, fruit prunings yield about 13.9 pounds per ton, and barley straw yields about 18.2 pounds per ton. In contrast, gasoline yields about 130.0 pounds per ton.

The fact that the conspicuous open burning of brush is by far less hazardous than the automobile caused pollution is of little consequence to the objectors of open burning because the smoke caused by brush fires can be easily seen.

The leaving of the brush along the right-of-way has the advantage of providing a habitat for small game, however, large piles of brush are unsightly and do provide some concern as a potential fire hazard.

The chipping of the brush has been limited primarily to the areas along the travelled ways where trailer mounted chippers can dispose of limbs up to about 4 inches in diameter. Larger chippers have been developed that can handle trees of a foot or more in diameter. These larger machines are not too adaptable to rights-of-way disposal.

Our program for control of the woody vegetation along the rights-of-way varies in accordance with needs and regulatory requirements. The use of chemical herbicides is

strictly controlled and limited to selective applications. Herbicide treatment is part of the initial clearing and is done either prior to cutting, or by treating the cut stumps, or (if conditions do not permit either of these) after the first or second growing season when the sprouted unwanted vegetation is treated with a basal application during the dormant season, if practicable. Selective methods of control results in the minimum use of herbicides. Re-applications in later years are less frequent and the amount of herbicide used per application is less as the rights-of-way become filled in with desirable species that are not sprayed but left to grow and mature. These methods avoid objectionable brown out when used during the dormant seasons.

In public supply watershed areas of both Connecticut and Massachusetts, "Ammate X-NI" is presently approved by the states as the herbicide to use. This requires a waterborne application during the growing season which unfortunately does produce visual brown-out, and greatly reduces selectivity.

The concern with the use of herbicides has been magnified by the news media. Extensive research and long years of actual application of these chemicals, without any

documented hazardous effects seemingly has not convinced the public that this is a safe and beneficial method of control. The increase in productivity of farm crop lands and range or pasture lands has been achieved largely through the use of those chemicals that eradicate the undesirable herbaceous and woody weeds. Unless a person is directly involved with land use, it is most difficult to appreciate the benefits the whole population has enjoyed through the use of these chemicals.

NU, seriously concerned with our vegetation control program, solicited the services of an independent consultant to thoroughly review our practices. This consultant, the "Center for the Environment and Man, Incorporated," has completed its study and made its report. It confirms that the methods of control used are safe and in accordance with the regulatory requirements. The consultant investigated our practices in the field and discussed them with leading herbicide authorities. The report is available for public review, and has been widely disseminated since its introduction last December.

The investor owned utilities through their organization, The Edison Electric Institute, has initiated a research project RP-103, "Environmental Effects of Herbicides."

The project is a continuation of several research efforts that have been conducted in the past. The research effort will be applied to soil ecology and the persistence of chemicals when applied in the rights-of-way. It will provide continuous monitoring of this important method of control.

It has been said that a problem recognized is a problem solved. Surely the problems of our environment are being fully recognized. Our needs for industrial expansion were recognized and it appears now that we put on blinders to overlook the side effects, thus creating many of the pollution problems we have today. Let us not again put on blinders and attack the pollution problems as an independent item. We must establish priorities for methodical solutions, and we must consider interrelationships in the total picture.

Communication is the basic requirement for effective preservation of a healthy environment. The most difficult job ahead will be keeping the public informed of the facts and influencing sound decisions based on those facts. This will not be an easy task, but it is in good, capable hands.



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TURFGRASS SEED AND FERTILIZER BIDDING SPECIFICATIONS

By WILLIAM E. KNOOP

EXTENSION TURF SPECIALIST, UNIVERSITY OF NEW HAMPSHIRE

SIZEABLE seed and fertilizer purchases often require the buyer to solicit bids.

Offering a proposed purchase of seed and fertilizer for competitive bids has several advantages. Because you are asking companies to compete for your business, they will quote the lowest price within a realistic profit margin. They must give you no more than stated in your bid specifications. If the specifications are not clearly presented, you will receive undesirable materials. Reasonable and correct specifications will assure quality materials at the best possible price.

SPECIFICATIONS FOR THE PURCHASE OF TURFGRASS SEED

Each state has laws to govern the production and sale of turfgrass seed. In general, each state requires the seed producer to list certain information on the seed container. It may be printed on the box or on a tag attached to the container. The information usually includes the following:

1. The name of the seed **producer** or **seller**.
2. The seed **lot number**.
3. The seed variety (sometimes including the scientific name)
4. The percent purity of each variety and species present (if a mixture).
5. The percent live seed of each variety as expressed by **germination**.
6. The percentage of any **weed** or **crop seed** present.
7. The percentage of any non-seed material present expressed as **inert matter**.
8. A list by variety of any noxious weeds present and their **rate of occurrence** (usually number of seeds per pound).
9. The **date** when last the seed was tested for germination.

Sample seed tag data are shown in Table 2. Your bidding specifications should include requirements for the same information. It is your prerogative to control the quality

of your proposed purchase by specifying the **purity** and **germination** percentages on your bidding proposal.

These should be considered minimum quality standards for turfgrass seed. In addition to purity and germination standards, you should specify that **there cannot be any noxious weeds present** and that the seed must have been **tested for germination within the past 9 months**. Usually the area to be seeded will require a mixture of turfgrasses rather than a single variety. When asking for bids on a seed mixture, there are several problems. The first is whether to specify the mixture in percent by weight or percent by volume. Another problem is how to be sure the seed obtained is indeed the mixture ordered. The best answer to both problems is to bid each grass variety separately and mix them yourself. A sample bidding specification follows. Note that the sample specification calls for 260 lbs. of Kentucky Bluegrass, 100 lbs. of Creeping Red Fescue and 40 lbs. of annual ryegrass. That will combine to form a 65% Kentucky Bluegrass, 25% Creeping Red Fescue and 10% annual ryegrass mixture.

SEED NOT MEETING SPECIFICATIONS

At one time or another seed meeting your purity or germination standards may not be available. In that event an adjustment may be made in the amount of seed purchased so the bid is not rejected.

As an example, in the sample bidding specifications, we ask for 260 lbs. of Kentucky Bluegrass of at least 85% purity and 80% germination. Purity x germination equals the percentage of pure live seed present. 85% purity x 80% germination = 68% pure live seed. Assume that Kentucky Bluegrass seed of a purity of 85% was not available and that the purity of the available seed was only 80%. This means that 80% purity x 80% ger-

mination = 64% pure live seed as compared to the 68% requested in the specifications. Rather than cancel the bids because no supplier could meet the specifications, the supplier could be allowed to increase the amount of seed to make up for the lower purity. The following shows how such an adjustment would be computed. The equation is:

$$C = \frac{A \times D}{B}$$

A = % pure live seed requested (68%),

B = % pure live seed supplied (64%),

C = amount of lower purity seed to be supplied,

D = amount of seed requested (200 lbs.).

Using the sample figures in parentheses,

$$C = \frac{68 \times 260}{64} = 276 \text{ lbs.}$$

The supplier could furnish 272 lbs. of his Kentucky Bluegrass and you would still have the same number of pure live seeds requested in the bid specification.

A sample statement for possible inclusion in bidding proposals might be as follows:

In the event that only seed lower in purity and germination than the above standards is available, the low bidder may furnish an increased amount of seed, at no additional cost, provided that he match on the basis of pure live seed the quality of the seed required in the bidding specifications. Seed 10% lower in either purity or germination will not be accepted.

SPECIFICATIONS FOR THE PURCHASE OF TURF FERTILIZER

Each state has a law governing the manufacture and sale of fertilizers. The manufacturer must place a statement guaranteeing the weight and analysis of the fertilizer

Table 1. Suggested Purity and Germination Percentages For the Common Turfgrass Varieties

Variety	Scientific Name	Purity	Germination
Kentucky bluegrass	<i>Poa pratensis</i>	85	80
Creeping red fescue	<i>Festuca rubra</i>	97	85
Tall fescue	<i>Festuca arundinacea</i>	98	85
Annual or Italian Ryegrass	<i>Lolium multiflorum</i>	97	85
Perennial Ryegrass	<i>Lolium perenne</i>	97	85
Colonial bentgrass	<i>Agrostis tenuis</i>	97	85
Creeping bentgrass	<i>Agrostis palustris</i>	98	85
Red Top	<i>Agrostis alba</i>	90	90

on, or attach it to, the bag or container. If the fertilizer is delivered in bulk, a written statement containing the same information must be supplied to the purchaser at the time of delivery.

The statement of analysis guarantee must contain the following

Table 2. Sample Seed Tag Data

JONES SEED COMPANY KENTUCKY BLUEGRASS			
Lot 21-557-B	Germ.	80.00%	
Purity 95.19%	Crop	3.06%	
Inert 1.73%	Weed	0.02%	
387 annl. bluegrass per 1 b.			
TESTED 9-70			

information expressed as percent by weight:

- The total amount of nitrogen (N) in the fertilizer.
 - The amount of water insoluble nitrogen (W.I.N.) present, if claimed (by the formulator).
 - The amount of phosphorus (P) present, expressed as P_2O_5 .
 - The amount of potassium (K) present expressed as K_2O .
- A sample label for a 12-2-8 fer-

tilizer might read:

Jones Fertilizer Company

Total Nitrogen	12%
W.I.N.	6%
Phosphorus (P_2O_5)	2%
Potassium (K_2O)	8%
Net Weight 50 lbs.	

Note that in the above example half (6%) of the total (12%) nitrogen present is in a water insoluble form. This means that half the nitrogen in the fertilizer is a slow release type. This characteristic makes it a good turf fertilizer.

Your bidding specifications should specify the following:

- The total amount of nitrogen (N).
- The amount of nitrogen in the water insoluble form (W.I.N.)
- The amount of phosphorus (P_2O_5).
- The amount of potassium (K_2O).
- If you want bag or bulk delivery. (If bag—the size of the bags)
- A statement to the effect that the fertilizer should meet the State standards.
- A statement concerning your bidding policy.

Table 3. Bidding Specifications for Turfgrass Seed

A. Amount (lbs.)	Variety	Scientific Name	Percent by weight Purity	Percent by weight Germination
1. 260	Kentucky Bluegrass	<i>Poa pratensis</i>	85	80
2. 100	Creeping Red Fescue	<i>Festuca rubra</i>	97	85
3. 40	Annual Ryegrass	<i>Lolium multiflorum</i>	98	85

B. Seed must have been tested by the State Analytical Services Lab within the past nine (9) months.

C. Seed shall not contain any noxious weed seed as defined by State seed laws.

D. Add your bidding policy statement plus any penalty clause.

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ECOLOGIZE— RALLY CRY FOR HIGHLAND PARK, MICHIGAN'S BEAUTIFICATION PROGRAM

HIGHLAND PARK, MICH., a city incorporated in the midst of Detroit, has developed a citizen program aimed at improving the ecology. A newly coined word—**ECOLOGIZE**—has become the rally cry for citizens in their quest for an action program.

One of the most enthusiastic disciples of the Ecologize movement is Edward R. Wujcik, Highland Park's director of public works. He has helped spearhead a continuing program which enlists the aid of both civic groups and citizens.

Official kick-off was May 22 of this year when the mayor, Robert B. Blackwell, issued a proclamation urging "every man, woman and child in this city to cooperate . . . to share the responsibility . . . to do his part to 'Ecologize' . . . this 365-day job . . . for everyone!" Prior to this action the mayor met with local businessmen, civic groups, and school

officials to devise the year-round program.

Public Works Director Wujcik believes success of the venture is assured and that it is gaining momentum. To date: businessmen have distributed lapel buttons, bumper stickers, litter bags, and posters to customers; the Junior Chamber of Commerce has developed an ecology flag for businessman use and many have agreed to fly them at least two days monthly; schools have developed and presented special ecology programs; young people have visited various neighborhoods and picked up loose papers; cleanup campaigns have abounded; city vehicles bear ecology decals or bumper stickers; city offices and schools fly the ecology flag; and the City has erected a sign on the main street proclaiming the city-sponsored 365-day ecology program.

Further, the City Council approved a plan for collection of glass and metal for recycling and is study-

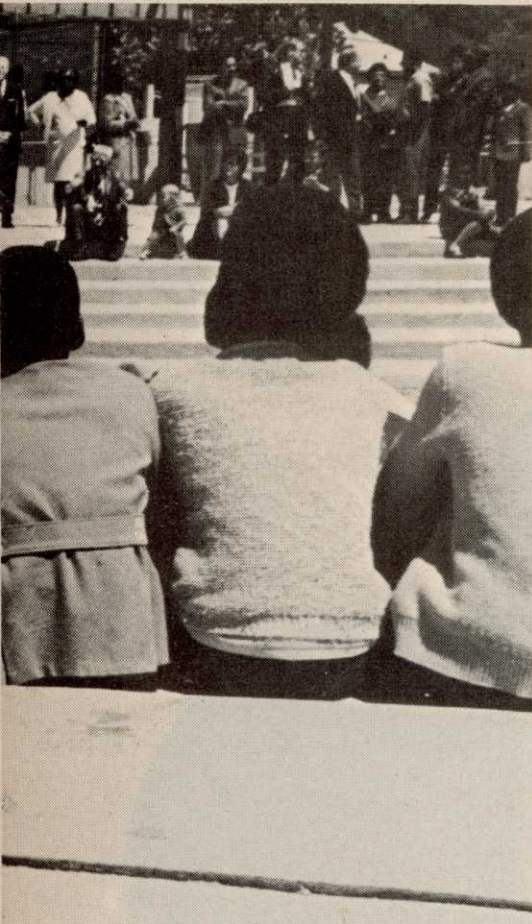
ing a means of collecting newspapers on a regular basis.

A special Ecologize kick-off was a part of the Highland Park annual Michigan Week Parade, with ecology floats being the parade theme. This in itself helped enlist additional civic groups support.

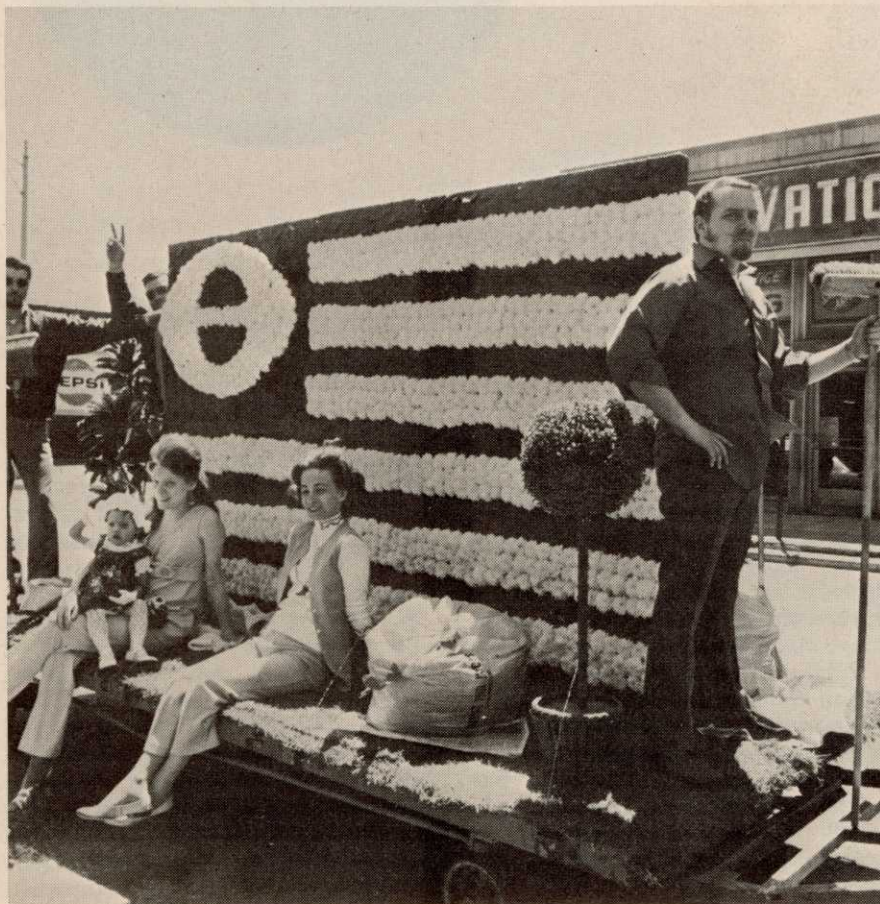
Other steps include a landscape program by the Michigan State University Extension Service which has an office in Highland Park; a series of clean-up projects by the Community Service Cadets, a group of young men aged 10 to 17 who work on such projects through the Model Cities Program; and construction of a small intercity park by students of the Detroit Society of Arts and Crafts. The City provided a \$3000 budget for this venture which developed into what Wujcik describes as "a 135 x 200 foot oasis in the middle of the City."

Highland Park, with its many and varied activities, Wujcik believes, has developed an enviable program of public accomplishment.

Editor's Note: **ECOLOGIZE** is a trademark and service mark of Environmental Rehabilitation Systems, Inc.



The Ecologize kick-off day coincided with Highland Park's annual Michigan Week Parade and became the theme for the event, featuring floats, left and below, along with a park ceremony. In picture above is E. R. Wukcik, the city's director of public works.



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ENVIRONMENTAL contamination has resulted in more emphasis being placed on efficiency in using pesticides. Over the last 25 years many workers have shown that toxicity of foliar applied herbicides is enhanced by the use of surfactants. Even with wide use of surfactants, the role they play is probably the least understood of all the agricultural chemicals used today. They increase pesticide performance in the field and also are an important aspect of the formulation.

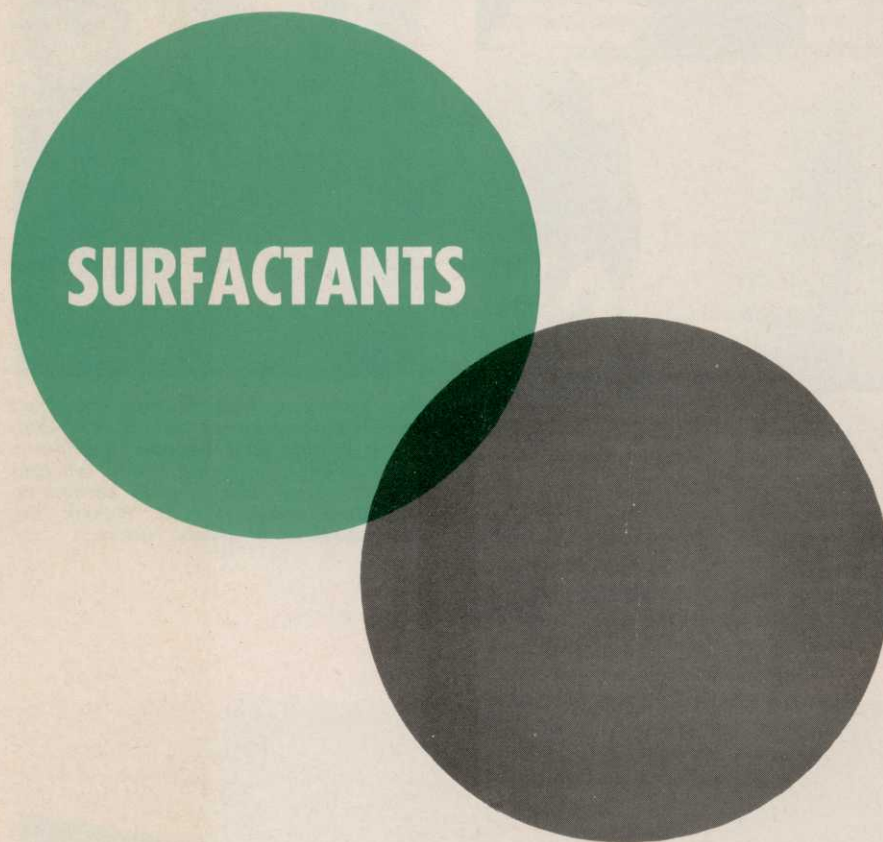
There is an old widely held idea, that any substance that will increase wetting will serve as a surfactant for any pesticide. Nothing could be farther from the truth. Some of the confusion has arisen because of terminology used by growers and non-technical users when discussing surfactants. The terms most commonly used interchangeably are activator, additive, adjuvant, detergent, soap, spreader, surface-active agent, surfactant, and wetting agent.

An additive is a material added to the spray solution and may or may not be a wetting agent or a surfactant. An adjuvant is a material that assists, aids, or modifies the spray solution in some manner. A detergent is a cleaning agent or solvent and does not necessarily enhance or modify a spray solution. A surfactant is a material which facilitates and accentuates the emulsifying spreading and wetting properties of a spray solution. A wetting agent is a compound which causes a spray solution to contact plant surfaces more thoroughly. It can easily be seen why confusion arises when discussing these compounds but remember that to wet a surface only means to cover or soak that surface with a liquid.

Surfactants come in a wide variety of types and each is designed for a particular use. They may be manufactured from numerous hydrocarbon nuclei and polar functional groups. At present there are several-thousand trade name surfactants available. For simplicity sake they may be grouped into three groups on the basis of their electrical charge, anionic-negatively charged, cationic-positively charged, and nonionic-neutral or no charge.

The non-ionic surfactants are most commonly encountered in agricultural sprays because they are relatively unaffected by water hardness and are compatible with all types of herbicides. Anionic sur-

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By **DAVID E. BAYER**

factants are the next most commonly used group but they can not be used satisfactorily in hard water or with certain herbicides. However, many commercially available surfactants are blends of the different surfactant types as well as with other chemicals in order to produce a high performance product. Buffering compounds are often used to prevent extremely hard water from interfering with a spray solution. Generally these surfactants are formulated and recommended only when those conditions prevail.

Once the proper surfactant has been selected the next most important factor to consider for in-

creasing herbicide phytotoxicity is the concentration of the surfactant. Wetting of plant surfaces is important to obtain coverage of the plant and in situations when contact herbicides are used this may be all that is desired. However, it has been found that the wetting of plant surfaces does not correlate with the increase in phytotoxicity. Maximum wetting occurs in the range of 0.01% to 0.1% concentration of the surfactant and maximum increase in phytotoxicity occurs in the range of 1.0% concentration. An idealized graph of increased phytotoxicity vs. surfactant concentration would show the main increase in

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activity occurs between 0.01% and 1.0% on a volume per volume basis (i.e. from two fluid ounces to four quarts of 100% active surfactant ingredient per 100 gallons of spray solution).

The average amount of surfactant to use in most herbicide solutions is approximately 0.1% to 0.5% (i.e. one pint to two quarts per 100 gallons of spray solution). The maximum effect obtained from a given concentration will vary with surfactant and herbicide. Phenoxy type herbicides (2,4-D) generally show maximum increase around 0.2% to 0.5%, while most other types of foliar applied herbicides (dalapon, amitrole, paraquat, etc.) show maximum effects from 0.5% to 1.0%.

Use should be made of this range of surfactant concentrations by taking into consideration the environmental factors preceding and at the time of spraying. In areas or times of high humidity and cool temperatures the need to include high surfactant concentrations in a herbicide spray solution are less than in areas or at times of low humidity and high temperatures. It must also be remembered that in very adverse weather conditions of extremely hot and dry periods the benefits derived from the use of a surfactant will be lessened. Older plants are generally more difficult to control than are younger plants. Plants suffering from water stress, nutrient deficiency, or covered with dust and insect damage, are more resistant to penetration and movement of herbicides.

Proper selection of the surfactant is of the utmost importance and care should be used to correlate it with the use intended. In some herbicide products the surfactant is formulated in the package sold to the consumer. The surfactant-herbicide choice has been made but the concentrations when mixed for use are often not proper for maximum uptake. When this occurs caution should be exercised in selecting and adding additional surfactant. Remember that even though phytotoxicity of the herbicide is increased by the use of surfactants it may not always be desirable as the surfactant may reduce selectivity thus eliminating species selectivity.

Surfactants are no miracle chemicals but when used properly they will enhance herbicidal efficiency. They will assist in lessening the possibility of damage to desirable plants by allowing the use of lower rates of the herbicide and decrease the cost of the herbicidal application.

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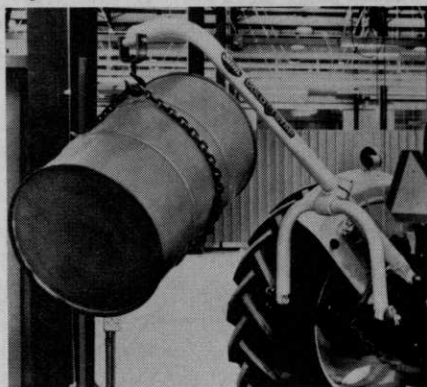
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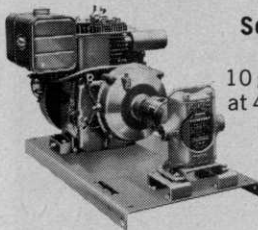
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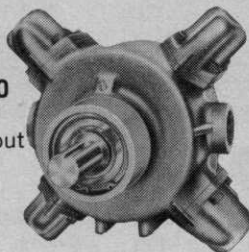
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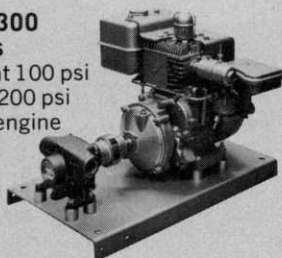
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DON'TS AND DO'S IN CLIENT RELATIONS

By RICHARD A. STEMM

CONSIDERING a consulting career or perhaps engaging in some moonlighting activity? If you are, then you may be interested in some of the do's and don'ts experienced consultants have found to be useful in their client relations.

Building a significant clientele is the goal of every independent practitioner; therefore the continual maintenance of good client relations is a must. The following do's and don'ts are suggested as a guideline. They have withstood the test of time, so they can be considered as being standard practice.

DO

- Dress according to normal standards of a successful man in your field. Avoid extremes and fads.
- Stay clean and well groomed.
- Act as an independent consultant in objectivity and initiative.
- Enjoy and appreciate other's attempts at humor, but only if it is in good taste.
- Avoid discussions involving internal and external politics.
- Keep all confidences, both business and personal.



- Observe protocol and ethics.
- Be sociable on the assignment.
- Accept kudos due you.
- Refuse to engage in discussions involving commissions, kickbacks, or gifts.
- Be objective in all activity.